3.4 COMMERCIAL AND SPORT FISHERIES

3.4.1 Introduction

Shore Terminals is located on the southwestern edge of Suisun Bay, which is bordered on the west by the Carquinez Strait and the east, by the Sacramento/ San Joaquin River Delta. Suisun Bay and Carquinez Strait are part of the San Francisco Bay-Sacramento/ San Joaquin Delta estuary, the largest estuary on the West Coast. The Strait and Suisun Bay serve as the transition areas between the ocean influence in the Bay and the inland freshwater influence of the Sacramento and San Joaquin Rivers. Major fisheries in Carquinez Straits to the western edge of legally defined Delta (detailed geographic focus of this EIR) include Pacific salmon, sturgeon, shrimp, striped bass, a host of other sport fisheries, and about 15 marinas, piers and public recreational areas that provide access to the waterways. In addition, Suisun Bay harbors American shad habitat, Chinook salmon fry habitat, and a cray fishery in Suisun Marsh sloughs. In the estuary the two main commercial fisheries are herring and shrimp; however, the herring fishery is active west of the Carquinez Bridge, outside the area of detailed focus for this EIR. Sport fishing, including fishing by minority and disadvantaged populations, targets several species, including striped bass, halibut, smelt and sturgeon, among other species. All of these activities, in addition to the harvest along the coast, contribute to California's fishing industry and recreational economy. The impact analysis examines the potential for impacts to these resources from continued operation of the marine terminal.

3.4.2 Existing Conditions

3.4.2.1 Regulatory Framework

Fisheries[1] depend on a healthy environment and responsible human activities to survive and flourish. This section focuses on the two general types of regulatory tools used to help ensure responsible human activities: controls on human development and resource harvesting management. Development can have a deleterious effect on the harvested resource or harvesting activities. Estuaries are complex and fragile and as such are imperiled by their proximity to intensive human activity and development. Long-term degradation of California's estuaries has been caused by sewage, industrial waste, dredging, filling of marshes and tidal flats, oil development and spills and degradation of upstream areas. In addition, environmental harms from non-indigenous or invasive species has increased exponentially in recent years (CDFG 2001).

Coastal zone development is regulated by the San Francisco Bay Conservation and Development Commission (BCDC) and the California Coastal Commission (CCC). BCDC develops and implements plans for the conservation and development of San Francisco Bay waters and regulates shoreline development, including commercial

[1] Fisheries are defined, by broad definition of the Federal Fishery Conservation and Management Act (FCMA), as fish, their habitat, and fishing activities.

and recreational fishing facilities. The CCC, which has authority along the coast (excluding San Francisco Bay), helps ensure that the biological productivity of coastal resources is maintained, enhanced, and restored for commercial, recreational, scientific, and educational purposes, and ensures that onshore commercial and recreational fishing facilities are protected and, where feasible, upgraded.

The California State Lands Commission (CSLC) manages and protects important natural resources and uses on public lands, including tidelands. Commercial and recreational fishing, kelp harvesting, and aquaculture are all considered important uses by CSLC. Permits are issued for development on tidelands, and mitigation is often required to help protect natural resources and access to those resources.

Other agencies with authority to regulate development and ensure protection of aquatic resources include the EPA, the Corps, the USFWS, and State and Regional Water Quality Control Boards.

If resources are adversely affected to the extent that productive habitat or populations are reduced, harvesting managers will likely respond by limiting harvests. A key example is the salmon fishery and fish declines attributed to timber harvest practices and inland water development. Fisheries, aquaculture, and kelp harvesting are overseen by several State and federal agencies, including the California Department of Fish and Game (CDFG), Federal Secretary of Commerce, the Pacific Fisheries Management Council, and NOAA Fisheries.

3.4.2.2 Methodology and Data Collection

The detailed geographic focus of this EIR is from the Interstate 80 (I-80) bridge, encompassing Carquinez Strait and Suisun Bay, to the western edge of the legally defined Delta, just west of Pittsburg. This area encompasses the marine terminal and areas east and west most susceptible to oil spills. Information for this area from existing information sources is updated, as needed. Vessels using the terminal transit through San Francisco Bay, so the area from the Golden Gate to the entrance of Carquinez Strait is the secondary area of study and will be generally described using existing data. Finally, potential for impacts from vessels transiting the outer California coast will be briefly presented by incorporating information from other documents by reference. Several databases and maps describe the fisheries, aquaculture operations, and kelp harvesting activities in these areas.

To characterize the existing environment in the estuary, CDFG catch and landing statistics, anecdotal information from interviews with knowledgeable individuals, and written materials were used to describe commercial and recreational fisheries. A short description of the CDFG fisheries databases is provided to explain their uses and limitations.

To standardize fish landing reporting, CDFG divides coastal and Bay waters into reporting blocks. CDFG provides both commercial and charter boat fish landings by

fishing area or block (where the fish are caught) and by port or region (where the fish are landed). Fish dealers, processors, or charter boat operators record landings data. For commercial fisheries, data concerning species, weight, catch block, mode (gear type), and price paid to fishing operators are provided to CDFG. Charter boat operators report to CDFG the number of fish caught on their boats.

The collected fish landings data have their limitations. For commercial fisheries, the data may not be entirely accurate or complete for several reasons. In order to maintain the secrecy of good fishing locations, fishing operators may report catches in blocks other than where the fish were actually caught. In addition, catches often occur in more than one block, but may be reported for only one block. Because of these limitations, the CDFG data are supplemented by other information to better describe the fisheries.

For recreational data, the charter boat landings provide the only consistent database that records angler catches, despite the fact that catches from recreational private boats, shore/beaches, and piers make up about 86 percent of total recreational catches (U.S. Department of Commerce 1997). Information from seafood consumption studies is used to further describe the fisheries but these data are based on short-term sampling studies that describe a snapshot in time, rather than a long-term history of fishing activity. These databases were used despite these limitations; qualitative updates are provided from other sources, as needed.

3.4.2.3 Carquinez Strait and Suisun Bay Fisheries, West of the Legally Defined Delta

Historical Overview

San Francisco Bay is divided into three connecting bays: San Francisco Bay proper, San Pablo Bay, and Suisun Bay. The Carquinez Strait links the Sacramento/ San Joaquin Delta and Suisun Bay with San Pablo and San Francisco Bays. This system of bays is influenced by the ocean and its tides and by large volumes of freshwater runoff from the Sacramento and San Joaquin River watershed; the Strait is where fresh and salt water meet. The watersheds begin in the Sierra Nevada and drain California's Central Valley. In general, most of the San Francisco Bay is very shallow, with an average depth of about 20 feet (Squire and Smith 1977).

One of the environmental influences on the estuary and its fish is movement of the null zone, which marks the upstream edge of seawater influence. The location of this zone moves upstream and downstream several miles daily, depending on changes in freshwater flows from the rivers and streams. On the downstream side of the zone, saltwater fish predominate; freshwater fish are found on the upstream side. Therefore, fishing areas for some species generally cover broad areas of the Bay, but shift within the areas depending on the zone's location. Changes in tides, water conditions, seasons, and human activities also influence the estuary's fisheries.

Historical Summary

The estuary's fisheries have always been important to humans as evidenced by the tens of thousands of people who lived along its shores before Europeans arrived. By the 1800s, fish were a major resource for settlers, with the primary species being Chinook salmon, sturgeon, striped bass, and Pacific herring. The Bay-Delta region was the largest fishing center on the west coast. However, human use of the Sacramento River system and the Bay took a heavy toll. Adverse impacts on the Bay and fisheries began with siltation caused by hydraulic mining in the mid-1800s. As California's population grew, extensive land reclamation, dredging and filling, urban development, water pollution, dams, upstream water diversions, and other water developments altered the Bay to such an extent that Bay fisheries declined significantly. Historically, over fishing also took a toll on fisheries. However, in recent years, other activities have caused major declines.

Another factor that drastically changed the Bay's food web was the introduction of non-native plant and animal species, beginning in the nineteenth century. American shad, striped bass, carp, and catfish were deliberately introduced. Introduction of non-native species accelerated in the twentieth century with the continued deliberate introduction of fish and the unintended introduction of harmful invertebrates and fish, mainly through ship ballast water (CALFED Bay-Delta Program 1999). The Asian clam was first detected in 1986 and within a few years was seen in concentrations of up to 1,500 per square meter in Suisun Bay. It is now the most abundant invertebrate species in Suisun and San Pablo Bays consuming food and dominating habitat that would otherwise serve native species (California State Coastal Conservancy 1995).

Historically, major native fisheries in the area included shrimp, sturgeon, and Chinook salmon, among others. Striped bass, an introduced species, is also very popular among anglers in the estuary.

Shrimp. The shrimp fishery began in the early 1860s; by 1871 Chinese immigrants fished using stationary shrimp nets and were exporting large quantities of dried shrimp meal to China. Annual landings peaked in 1890 to over 5 million pounds. By 1915, shrimp were fished by beam trawl and in 1935 landings totaled 3.4 million pounds. Landings steadily declined due to reduced demand for fresh and dried shrimp for food. By the early 1960s, average annual landings declined to 1,500 pounds. In 1965, this fishery bounced back to supply as live bait for sturgeon and striped bass sport fishing (CDFG 2001).

Sturgeon. Sturgeon have been very important to Californians; sturgeon remains have been found in Native American middens in the Bay/Delta region. White sturgeon has dominated the fishery; although there have been small catches of green sturgeon. The commercial fishery lasted from the early 1860s to 1901 and concentrated in the Bay and Delta. Fishing gear included gillnets, longlines and multiple unbaited hooks. Landings peaked at 1.65 million pounds in 1887, declined to 0.3 million pounds in 1895 and to 0.2 million pounds in 1901, when the fishery was closed. Sport fishing for sturgeon was later legalized in 1954. In 1964, the small catch increased significantly when the

minimum size limit decreased from 50 inches to 40 inches and it was discovered Bay shrimp were effective bait. By the 1980s the harvest rate was 40 percent greater than the rate during the two earlier decades. In 1992 a minimum size limit of 46 inches and a maximum 72-inch size limit were established to protect the species from over harvest. (CDFG 2001). Permitted fishing gear is limited to hook and line.

Chinook salmon. The only major salmon species to enter the Golden Gate is Chinook salmon. As with sturgeon, salmon fisheries existed long before European settlers arrived in the 1700s. Harvests of Sacramento/San Joaquin watershed Chinook salmon by American Indians may have exceeded 8.5 million pounds annually. Traditional fishing methods included use of gill and dip nets, fishing spear and communal fish dams. The commercial fishery began with the advent of the gold rush. By 1860 the gillnet fishery was well established in Suisun Bay, San Pablo Bay and the lower reaches of the two rivers. The canning industry stimulated the growth of the fishery, with canneries operating throughout the river system. In 1882 the fishery reached its peak when 12 million pounds were landed. Shortly thereafter, the fishery collapsed due primarily to pollution and degradation of rivers by mining, agriculture, and timber operations, combined with increased landings. By 1919 the last cannery closed, and in 1957 the last inland commercial fishing area open to the general pubic was permanently closed (CDFG 2001).

The ocean troll fishery continued and today's trollers use fishing techniques developed during the 1940s. In addition, electronic equipment has significantly increased the efficiency of the modern troller. In the 1960s and 1970s the fishing industry enjoyed relatively high and consistent harvests, averaging about 7 million pounds annually of Chinook. Later commercial harvests have been much more erratic, with the largest catch being 14.4 million pounds in 1988 and the lowest harvest being 1.6 million pounds in 1992, an El Niño year (CDFG 2001).

The ocean sport fishery became popular with the development of the commercial passenger fishing vessel (CPFV) after World War II. The highest sport landings occurred in 1995 when anglers landed a record 397,200 Chinook. The lowest landings during the last 30 years were recorded in 1983, (CDFG 2001).

Oceanic and in-river conditions play major roles in salmon catches, however the variability can also be attributed to changes in fishery regulations. Since 1988, progressively more restrictive regulations have been imposed on the commercial fishery to protect stocks of special concern, including those that are federal and State endangered or threatened species. As an example, the sport fishery is the only allowable salmon fishery in the estuary.

Striped bass. A major sport fishery has evolved around the striped bass. Striped bass were introduced in 1879 by railcar from the east coast; 132 were unloaded in Martinez and released in the Carquinez Strait. Three years later 300 more bass were shipped in and released; the entire west coast striped bass fishery evolved from these

introductions. In the 1970s legal sized bass (over 18 inches) numbered around 2 million. By 1995, because of pollution and freshwater diversions the population of legal bass hovers around 800,000 (California State Coastal Conservancy 1995).

Fisheries Near the Shore Terminal

Shore Terminals is located in CDFG fish block 308. This block encompasses the Carquinez Strait and western extent of Suisun Bay; block 302 includes the remainder of Suisun Bay. Reported landings for blocks 302 and 308 are scant. For all CDFG blocks, catch data appear to be sporadic from year to year due to inaccuracies in the reporting of landing locations. The data are supplemented by information from other sources.

Commercial Fisheries

Shrimp. The prominent commercial fishery in the vicinity of the marine terminal is the shrimp trawl fishery. The modern fishery, which began in 1965, has been harvested entirely by beam trawl. Most shrimp are harvested for bait; a small percentage of catch is still reserved for human consumption. Live tanks are used on all vessels and shrimp are transported to local bait shops by truck in either the tanks or iced-down wooden trays.

From 1989 to 2001, recorded landings in block 308 totaled about 17,000 pounds. In block 302 only 140 pounds of shrimp were recorded as landed. These landings compare with over 18 million pounds for the entire estuary; by far, most shrimp are caught in South San Francisco Bay (see Appendix C-1 for landings in the Bay estuary). Along with shrimp, trawlers also harvest staghorn sculpin and yellowfin goby, for example totaling 2,420 pounds and 2,269 pounds, respectively, over the same time period in block 308.

Current information indicates that shrimp trawling occurs in San Pablo Bay and into the Carquinez Strait, in waters near the Shore terminal (Figure 3.4.1 – Major Commercial Fisheries). Fishing also occurs in waters less than 20 feet deep in the channels of the Estuary's shallow reaches. In 1999 eight trawlers harvested shrimp in north San Francisco Bay, San Pablo Bay, Petaluma Creek and the Carquinez Strait. Fishing occurs year round but landings usually peak during the months of June through November. Monthly variations in landings may have as much to do with changes in salinity in the water, as with fluctuations in demand by sport anglers (CDFG 2001).

Charter/Private Boat Sport Fisheries

Marinas near Shore terminal include Crockett, Martinez, Benicia, Glen Cove, and Vallejo. In Suisun Bay, Port Suisun, Suisun Marina and Boat Works, Pierce Harbor, Solano Yacht club, Harris Yacht Harbor and McAvoy Yacht Harbor service sport boats. In all, eleven facilities provide launches and berths for charter and private boats. Figure 3.4-2 (Major Sport Fisheries) shows the Strait and Suisun Bay provide American Shad, Chinook salmon fry and shallow water fish habitat for numerous species.

1 3.4-1 – Major Commercial Fisheries

3.4-2 – Major Sport Fisheries

Recorded charter boat catches in CDFG blocks 302 and 308 show that striped bass, spiny dogfish, sturgeon and smelt are the most popular species caught in the area (Appendix C-2). Compared to the rest of the Bay, charter boat activity is relatively light. Private boat anglers are expected to follow similar fishing patterns. Observations from the Shore marine terminal in November 2002 indicate that private boats occasionally visit the area.

Bay area boat anglers represent several ethnic backgrounds. In 2001 the California Department of Health Services (CDHS) and San Francisco Estuary Institute (SFEI) conducted a seafood consumption study and surveyed anglers throughout the Bay estuary. In the immediate area, the Vallejo Marina was a survey site for private boat anglers. From this data it is known that of the 137 anglers surveyed 5 percent were African American, 9 percent were Latino/Hispanic, 14 percent were Asian, 63 percent were Caucasian and 10 percent either did not know their background or represented other ethnicities (Table 3.4-1). Only one interviewee was non-English speaking (Spanish); the majority of Asian interviewees were Filipino (37 percent), Vietnamese (21 percent) and Pacific Islander (21 percent). The sample size represents about 10 percent of the 1,331 people surveyed throughout the Bay (SFEI 2001).

Table 3.4-1
Ethnic Backgrounds of Surveyed Anglers

Sites	African/ American		Latino/ Hispanic		Caucasian		Asian		Other/ Unknown		Total	
	N *	%*	N	%	N	%	N	%	N	%	N	%
Vallejo Marina	7	5	12	9	86	63	19	14	13	10	137	100
Vallejo Waterfront	19	21	11	12	27	29	30	33	5	5	92	100
Martinez Shoreline Park	1	2	2	4	39	76	7	14	2	4	51	100
Total	27	10	25	9	152	54	56	20	20	7	280	100

***N = Numbers of interviews; % = row %.**
Source: SFEI, 2001.

Pier and Shore Fishing

Public piers, shoreline, and beach areas that provide access for fishing are located throughout the Bay Area; however, access to the open water in the immediate area of the terminal is limited. Most shoreline access is provided in or near marinas and on or near several piers. Piers and public shoreline areas near the terminal include Crockett Marina and Dowrelio Pier, Martinez park and public pier, 9th Street Park and pier in Benicia, Benicia Marina and pier, Benicia State Recreation area, and Vallejo fishing pier and shoreline parks. Anglers have been known to catch flounder, sturgeon, shad, salmon, steelhead, and striped bass from these areas (California State Coastal Conservancy 1995). Of interest, is the largest recorded sturgeon, which weighed 468 pounds when caught in the Carquinez Strait in 1983 (CDFG 2001). The fish is mounted at the Crockett Historical Museum.

The seafood consumption study also surveyed landside anglers at Vallejo Waterfront and Martinez Shoreline Park. Table 3.4-1 summarizes the data from the two areas; 92 people were surveyed at the Vallejo site and 51 were surveyed at Martinez. One interviewee was non-English speaking (Spanish); of the Asian Vallejo interviewees, the majority were Filipino (73 percent), Pacific Islander (17 percent) and Chinese (7 percent). In Martinez, the majority of Asian interviewees were Filipino (29 percent), Vietnamese (29 percent), Chinese (14 percent), Pacific Islander (14 percent) and mixed Asian heritage (14 percent).

Boat and shoreside anglers surveyed for the Seafood Consumption study in Vallejo and Martinez consumed white croaker (38 percent of anglers), leopard shark (37 percent) and striped bass (24 percent) caught in the estuary. Two percent of anglers targeted and consumed sturgeon and about 1 percent of anglers targeted and consumed jacksmelt, halibut and starry flounder (Ujihara 2002).

Future Trends

Commercial Fisheries

Shrimp. Expectations for the shrimp fishery remain as they are now; most of the product is used for angler bait, and little is reserved for human consumption. The market is not expected to change much over the next 20 years. Shrimp populations appear to vary widely from year to year. Studies show that abundance of California bay shrimp increases with increased river inflow to the estuary, probably because juvenile shrimp favor low-salinity habitat. Harvest management is limited to compiling logbook data and monitoring species composition in Bay shrimp landings. Catch limits, closed seasons or restricting harvest in areas are not considered necessary by fisheries regulators because the limited demand maintains fishing effort at levels which would not threaten long-term sustainability of the species. If freshwater inflows increase due to upstream fishery restoration efforts there may be a beneficial effect on the shrimp fishery (CDFG 2001).

Sport Fisheries

Demand for recreational fishing, in general, may increase as the Bay Area human population increases. However, recreational fisheries are on a general decline. As with commercial fisheries, recreational fishing growth is limited more by the supply of healthy fish than by demand. Therefore, if the Bay's condition significantly improves, recreational fishing will likely grow. The reverse situation is also possible.

Sturgeon. Sturgeon annual harvest estimates show that angling regulation changes begun in 1990 are reducing harvest rates by about 50 percent of the levels seen in the 1980s. Despite the decreased fishing effort, sturgeon populations vary greatly over the years. The highest estimate of 142,000 fish was in 1997. Annual fish populations vary due to changes in high spring fresh-water outflows from the Delta and scientists attribute the high population levels to the very wet 1982-1983 period. Conversely, experts note the severe 1987-1992 drought adversely affected reproductive success

and is now causing a substantial decline in the adult sturgeon population, as recruitment nearly ceases and reduced growth rates and mortality limit the abundance of fish in the harvestable population. Another cycle of increased populations is expected as fish from the wet years, beginning in 1993, mature (growth to adult maturity takes about nine to sixteen years) and enter the fishery. Experts expect that no future angling restrictions are needed, due to low harvest rates, past rapid recoveries from population lows and current protection of the most fecund females by the 72-inch maximum size limit (CDFG 2001).

Salmon. The recreational salmon fishery is expected to remain unstable due to watershed and Bay-Delta degradation, fluctuations between drought and wet years, and listing of species as either Endangered or Threatened pursuant to federal and/or State Endangered Species Acts. Three emerging trends may prove hopeful for the fishery. Ocean fishery management quotas are growing stricter as fish populations become more threatened. Restoration in the Sacramento and San Joaquin watersheds, including the Delta and the Bay, is increasing as more species are listed and more financial resources are devoted to improving habitat. Lastly, negotiations over increasing water flows from upstream water developments and diversions in the rivers and Delta are on going. If these efforts are successful, beneficial effects may be seen in 10 to 20 years.

Striped bass. As with salmon, the future of the striped bass fishery is uncertain. The fishery's future depends on present efforts to successfully screen water diversions, to succeed at hatchery programs and to deal with competing uses of the Bay-Delta watershed, including the needs of native species.

3.4.2.4 San Francisco and San Pablo Bay Fisheries

Commercial Fisheries

Pacific Herring. Currently, Pacific herring is the largest commercial fishery within the Bays. The herring fishery is important in terms of San Francisco area port landings (43 percent of total landings in 2000) and is important from a statewide perspective as well. In 2000, herring landings were the tenth highest in California, representing over 1 percent of all landings in California. Nearly all were caught in San Francisco Bay. In the 2002 season, a total of 440 permits for San Francisco Bay (down from 446 during the 1999 season) were issued by CDFG (Ashcraft and Peterson 2002). For the 1989 through 2002 seasons, over 363 million pounds of herring were landed in the Bay, averaging about 26 million pounds per year.

Herring harvest occurs during spawning season, generally from December through March, until quotas are filled. The focus of the herring harvest is the roe, which is exported to Japan. The main fishing method is a gillnet, which catches the herring just before they spawn. A less used method is the roe-on-kelp method. Kelp is harvested from southern California and hung from barges in the Bay; herring spawn on the kelp, which is then landed and processed.

As stated earlier, herring have no preferences to specific locations of the Bay. Historically, primary spawning areas have been the shoreline along Sausalito, Richardson Bay, Fort Baker, Yellow Bluff, Tiburon, Paradise City, and Angel Cove. Over the last 10 years, most herring fishing occurred in block 488, according to CDFG catch block data. However, herring have also been known to spawn in the South Bay, especially during years with higher than normal rainfall.

Shrimp. In 1965, this fishery was developed to supply Bay shrimp as live bait for sturgeon and striped bass sport fishing. Since then, the commercial harvest has been entirely by beam trawl. A small percentage of catch is still consumed fresh. In addition to Bay shrimp, brine shrimp are harvested from salt ponds. From 1989 to 2000, recorded landings in blocks 300, 301, 302, 308, 488, and 489 totaled over 18.3 million pounds of shrimp. Over 17 million pounds were recorded in block 489 (South Bay) alone.

Over the last 10 years, the number of vessels harvesting shrimp has remained steady at about 14. Fishing occurs year-round. Live tanks are used on all vessels and shrimp are transported to local bait shops by truck in either the tanks or iced-down wooden trays. Staghorn sculpin, yellowfin goby, and long jaw mudsucker are also caught in the nets and sold.

Key fishing locations include South Bay, northwestern San Pablo Bay, Carquinez Strait, and salt ponds in the South Bay. Fishing also occurs in waters less than 20 feet deep in the channels of the Estuary's shallow reaches.

Other Fisheries

Small fisheries also exist for finfish and shellfish, including white croaker, halibut, rockfish, salmon, shark, and Dungeness crab.

Details on recorded fish catches in the South, Central, and North Bays for those species representing about 95 percent or more of the catch from 1989 to 2000 are provided in Appendix C-1.

Future Trends

Future trends for the Bay are those as described in Section 3.4.2.3.

Sport Fisheries

The Bays support a wide variety of fishes for sport fishing opportunities including charter fishing, private boat fishing, pier fishing, and beach/shore fishing. There are over 100 boat launches, marinas, and piers for use by anglers. The most popular game fishes caught in the Bays are striped bass, Chinook salmon and sturgeon. While most salmon fishing occurs in the ocean outside the Golden Gate, striped bass is caught through-out the estuary and sturgeon fishing concentrates in San Pablo Bay, portions of

South Bay and points east. Surfperch, halibut, bay shrimp, smelt, rockfishes, sharks, rays, clams, and others also offer great fishing opportunities to Bay Area anglers (California State Coastal Conservancy 1995).

Appendices C-3 and C-4 present the different marinas and their associated facilities and the public fishing piers in the Bay Area. Details of charter boat catches by catch block are included in Appendix C-2. Between 1989 and 2001, the number of charter boats operating out of San Francisco Bay ranged from a high of 93 to a low of 45, averaging 62 over the 13 years. In 2001, charter boats operating in San Francisco Bay and the Delta numbered 48, total number of anglers were 55,966 and they caught a total of 105,440 fish (CDFG 2001a).

As with the eastern portion of the estuary, the ethnic make-up of anglers throughout the estuary is diverse. Caucasians made up 39 percent of those interviewed (1,331) for the seafood consumption study, while Asians made up 33 percent, Latinos/Hispanics made up 13 percent and African Americans totaled 9 percent. By far, most were English speaking (88 percent), followed by Spanish (4 percent), Vietnamese (3 percent) and Cantonese (1 percent) (SFEI 2001). Comparatively in Vallejo and Martinez, Caucasians made up a higher percentage of anglers (54 percent), while there was a lower percentage of Asian and Latino anglers (20 percent and 9 percent, respectively).

Throughout the estuary, striped bass was targeted and consumed by 55 percent of anglers, while 23 percent focused on halibut, 18 percent preferred jack smelt, sturgeon and white croaker and about 4 percent consumed salmon caught in the estuary (CDHS 2001). Consumption patterns by Vallejo and Martinez anglers were different probably due to geographic location and fish species distribution. White croaker and leopard shark were most popular, followed by striped bass, sturgeon and a host of other species.

3.4.2.5 Outer Coast: Oregon Border to Mexico

Commercial and Sport Fisheries

Commercial fisheries are generally described using port landings for all ports in California, including those in Eureka, San Francisco, Monterey, Santa Barbara, Los Angeles, and San Diego. Collectively, these ports reported a total of 4.9 billion pounds of fish taken from 1989 through 2000. For sport fisheries, in northern California, a total of 72.9 million finfish were reported taken by surveyed anglers from shore, party boats, and private boats from 1989 to 2001. For the same years in southern California, 163.7 million finfish were reported caught by surveyed anglers.

Marine Aquaculture and Kelp Harvesting

There are 41 registered marine aquaculture facilities along the California coast and marine aquaculture leases totaled 11 in 1998. As of 2001, seven kelp bed lessees leased 24 kelp beds totaling 32.56 square miles from Ano Nuevo (San Mateo County) to San Diego.

3.4.3 Impacts Analysis and Mitigation Measures

Routine operations, spills, and other accidents would affect commercial and sport fishing. Analyses of routine operations and accident conditions focus on continuation of the Shore marine terminal wharf operations, as described in Section 2.0. Resource impacts are fully explained in Section 3.3.3 (Biological Resources), water quality impacts are described in Section 3.2.3 and system safety/risk-of-upset impacts are explained in Section 3.1.3. Impacts, when relevant, are summarized in this section and included in the assessment of impacts on fisheries.

Impact Significance Criteria

An impact would be considered adverse and significant if:

- Project activities temporarily reduce any fishery in the Bay, Straits or along the outer coast by 10 percent or more during a season, or reduce any fishery by 5 percent or more for more than one season.

- Project activities affect kelp and aquaculture harvest areas by 5 percent or more.

- Lost harvesting opportunities due to harbor closures, impacts on living marine resources and habitat, and equipment or vessel loss, damage, or subsequent replacement could occur.

These significance criteria are used in a number of offshore development EIRs and are considered appropriate, because commercial and recreational fishing businesses operate on slim profit margins. Relatively small reductions in fishing combined with closures of harbors and marinas could have large economic repercussions.

Assumptions for Assessing Fisheries Impacts

To determine the impacts associated with routine operations over the next 20 years, the following assumptions were made:

- The analysis considers vessel movement and operations for Shore terminal only.

- The terminal is expected to continue operating 24 hours a day, 365 days a year. The wharf portion is 40 feet wide and 100 feet long. It is connected to shore by a 1,700 foot long elevated trestle carrying an 11 food wide roadway and a pipe rack. In 2002, 164 vessels called at the terminal. Since 1998, tankers and barges made from 2 to over 4 calls per week and averaged 178 vessel calls per year. Annual vessel calls could increase to 240 (the maximum based on current upland storage capacity) to 325 (the maximum based on maximum upland storage capacity buildout) over the next 20 years, a potential increase to 4 to 6 calls per week (a 26 percent to 45 percent increase from current activity).

- Vessels approach the terminal from Bulls Head Channel traversing through CDFG blocks 488, 301 and 308. The length of the vessel route from the Golden Gate to the terminal is about 32.1 miles. A one-way trip through the Bay to the terminal takes a vessel, on average, 3.21 hours. Roundtrip vessel transit times within the Bay Estuary for 178 vessel calls currently average about 48 days per year or about 13 percent of the time available during a year. Over the next 20 years roundtrip transit times could increase to 64 to 87 days or 24 percent to 45 percent of the time available during the year.

- The terminal can accommodate vessels no longer than 950 feet long and bridge passings limit the width of vessels to 130 feet wide.

- Fishing operators normally navigate a safe distance from an obstacle to avoid collision and entanglements. A 0.25-mile buffer around transiting vessels and a 0.5-mile buffer around the terminal constitute fishery exclusion zones for all fisheries.

- Preclusion impacts are based on comparing the size of the exclusion zones at the terminal and around transiting vessels to the aerial extent of mapped fishing areas in CDFG blocks 488, 301 and 308. It is assumed that fish catches are evenly distributed within the mapped fishing areas.

3.4.3.1 Shore Marine Terminal Routine Operations

Impact FSH-1: Space Use Conflicts for Commercial and Sports Fisheries

The major commercial fishery, shrimp trawling near the Shore terminal, is small when compared with landing from other portions of the Bay and Shore operations and the fishery is located at the Benicia Bridge away from terminal operations. No shoreline fishing occurs within 0.5 mile of the wharf. Space use conflicts with commercial and sport fishing activities are considered to be less than significant (Class III).

Shore Terminals operations occur in CDFG block 308 and according to Section 3.4.2.3, the prominent commercial fishery is the shrimp trawl fishery. The trawl grounds closest to the terminal are located in the Carquinez Strait. Landings have historically been very small, 17,000 pounds, when compared with landings over the last 11 years (1989 – 2001) from other areas of the Bay estuary. Boat and shore side anglers target striped bass, spiny dogfish, sturgeon, smelt, flounder, shad, salmon and steelhead. Over the next 20 years fishing patterns are expected to change little, if at all.

Routine operations at the terminal will continue to cause less than significant (Class III) space use conflicts (preclusion impacts) with commercial shrimp trawling because the eastern extent of the traditional trawl area in the Carquinez Strait ends at about the Benicia Bridge (Interstate 680).

With regards to sport fisheries, the waters surrounding the terminal support American shad, Chinook salmon fry and shallow water fish habitat for numerous species. The 0.5-mile buffer excludes less than 5 percent of the sport boat fishing area in block 308 and no shoreline fishing occurs within 0.5 mile of the wharf. Space use conflicts with commercial and sport fishing activities are considered to be less than significant (Class III). Impacts related to vessels transiting the Bay are discussed in Impact FSH-4.

FSH-1: No mitigation is required.

Impact FSH-2: Impacts on Fish and Habitat from Discharge of Ballast Water

Invasive species discharged from ballast water could impair water quality (Impact WQ-2) and biological resources (Impact BIO-4) that would also impair commercial and sports fishing activities in the Bay and outer coast, resulting in significant adverse (Class I) impacts.

Impacts on fish and habitat will likely continue from discharge of ballast water, stormwater runoff, and maintenance dredging. Water Quality Section 3.2.3.1 (Impact WQ-2) concludes that discharges of ballast water from tankers at Shore terminal may contain harmful microorganisms that could impair fishing activities, estuarine habitat, fish migration, preservation of rare and endangered species, and fish spawning. Biological Resources Section 3.3.3.1 (Impact BIO-4) concludes that discharged ballast water and non-indigenous species that attach to ship hulls can continue to have devastating effects on benthic resources. The invasive species could out-compete Dungeness crabs and other species important to the food web. Introduction of non-indigenous species, such as the Asian clam, may compete with native fishes and may reduce available food. Asian clams also tend to concentrate pollutants such as selenium and organotins in its tissues. Fishes that feed on the Asian clam, that include bottom feeders such at sturgeon, may have the potential to ingest quantities of toxins. Invasive species' adverse effects on fish and habitat have the potential to impair sport and commercial fisheries in the Bay and on the outer coast and likely cause significant adverse impacts (Class I).

Mitigation Measures for FSH-2:

FSH-2: Shore Terminals shall implement the mitigation measure WQ-2 for completion of a ballast water reporting form for each vessel and adhere to the current "Ballast Water Management for Control of Nonindigenous Species".

Rationale for Mitigation: See WQ-2. The measure provides an interim tracking mechanism until a feasible system to kill organisms in ballast water is developed.

Residual Impacts: The discharge of ballast water to San Francisco Bay commercial and sports fisheries will remain a significant adverse impact (Class I).

Impact FSH-3: Stormwater Run-off from the Wharf

Shore contributes incrementally to water quality contamination and thus fish contamination, which could result in a loss of fishing opportunities because anglers prefer to stay away from contaminated fishing area. This is a significant adverse (Class II) impact.

Stormwater run-off may increase adverse biological effects on species sensitive to contaminants. In addition, Section 3.2.3.1 (Impact WQ-7) concludes that constituents in runoff, such as arsenic, copper, lead, mercury, zinc, fluorine and phenanthyrene are at elevated levels near Shore Terminals and are probably causing adverse effects on benthic organisms. As a result, contamination from the terminal may incrementally contribute pollutants to the Estuary that are accumulating at levels high enough to degrade beneficial uses, including fishing and enjoyment of Estuary resources. Of particular concern is the effect of mercury and other pollutants on anglers who consume white croaker, leopard shark, striped bass, sturgeon and other fish species caught in the area. Shore's contribution of runoff is small, but because water quality contaminant levels exceed water quality criteria, Shore contributes incrementally to area fish contamination. This could result in a loss of fishing opportunities because many anglers prefer to stay away from areas known to contain contaminated fish, and results in a significant adverse impact (Class II).

Mitigation Measure for FSH-3:

FSH-3: Shore Terminals shall abide by the mitigation measures WQ-3 and WQ-7 for preparation of a Storm Water Pollution Prevention Plan (SWPPP) and implement additional Best Management Practices (BMP's).

Rationale for Mitigation: A feasible system to kill organisms in ballast water has not been developed. Effects from contaminants in stormwater runoff from Shore Terminals can be reduced to less than significant by limiting future discharges, however, effects on Bay fisheries as a major food source will remain.

Impact FSH-4: Space Use Conflicts on Bay Shrimp Fishery from Transiting Vessels

Space use conflicts between transiting vessels serving the Shore marine terminal could occur if commercial shrimp trawlers operate 12 hours or more per day during the fishing season. A significant adverse (Class II) impact could result.

In the Carquinez Strait, vessels servicing the Shore terminal would be expected to continue transiting directly through the shrimp trawl grounds. Due to the location of the trawl grounds, area available to transiting vessels and the .25 mile buffer, shrimp trawlers would likely continue to avoid fishing in the vicinity of a transiting vessel during its journey through the Strait. The vessel transit route would continue to block nearly all of the 2.7 square mile shrimp trawl area for the next 20 years. However, about .35 square mile (or about 13 percent of the trawl grounds) would likely be blocked at

any one time, as a vessel steams through the area. However, the time factor that a vessel travels through the area must be considered. On average, a vessel would be in the fishery area about 24 minutes for a one-way trip. Round trip transit times through the shrimp fishing area would range from six to eleven days per year depending on the number of vessels servicing the terminal. Assuming shrimp trawling occurs year round, over the next 20 years, the shrimp fishery would be blocked from about 1.6 percent to 3 percent of the time, resulting in a less than significant impact (Class III). If fishing occurs 12 hours per day, the percentage of time commercial trawlers would not available to fish due to vessel transits through the fishing area would likely increase to 3.2 percent to 6 percent of the time available during the year, resulting in a significant adverse impact (Class II).

Mitigation Measures for FSH-4:

FSH-4: Shore Terminals shall notify the shrimp trawlers operating in Carquinez Strait of increases in vessel transits associated with terminal operations. In addition, Shore shall inform incoming vessel operators of shrimp trawling activities near the terminal.

Rationale for Mitigation: By providing information to shrimp trawler and to vessel operators, potential space conflicts may be avoided. Impacts would be reduced to less than significant.

Impact FSH-5: Space Use Conflicts on Bay Herring Fishery from Transiting Vessels

Space use conflicts between transiting vessels serving the Shore marine terminal and commercial herring operators could occur resulting in interference or displacement of herring fishing activities. A significant adverse (Class II) impact could result.

Herring fishing and shipping activities, in particular, would likely conflict because vessels servicing the Shore terminal would pass through active fishing areas, thus interfering with or displacing herring fishing activities. CDFG works with concerned parties to minimize conflicts; however, some fishing areas may be inaccessible. Herring fishing currently occurs predominantly within CDFG blocks 488 (Central Bay) and 489 (South Bay). In block 488, the fishing area currently totals nearly 18 linear miles. Fishing in South Bay takes up more than double the amount of area, about 40 linear miles. In all, herring fishing areas occupy about 56 linear miles compared to spawning habitat that occupies about 268 linear miles. In any year, fishing could occur anywhere in the habitat areas.

In block 488, shipping corridors used by vessels servicing the Shore terminal pass through current herring fishing areas around Angel Island, off Alcatraz, and along portions of the Tiburon shore. In block 489, lightering operations at Anchorage 9 could continue to interfere with herring fishing operations. At any one time, a vessel would likely pass through about 10 percent of the fishing area for 13 percent to 24 percent of

the time that fishing is occurring, and could result in be significant adverse (Class II) impacts. In the future, impacts on herring fishing activities may vary because the fish change their spawning locations. Future interference with herring fishing activities could result in significant adverse impacts ranging from Class II to Class III.

Mitigation Measures for FSH-5:

FSH-5: Shore Terminals shall notify the herring fishery during the herring season of vessel transits. Shore shall also participate in the Pacific herring commercial fishery annual public scoping and hearing process, part of CDFG's annual review of herring commercial fishing regulations. CDFG has the authority to modify or develop regulations to address space use conflicts between the fishery and Shore's operations.

Rationale for Mitigation: The use of notification during the 1-3 week herring season would serve as a warning system notifying the herring fisherman of the transiting vessels. This would serve as an aid to avoid interference between transiting vessels and herring fishing activities. Participation in the CDFG review of herring regulations will help keep Shore up-to-date on space use conflict regulations. Impacts would be reduced to less than significant.

Impact FSH-6: Space Use Conflicts on Bay Sport Fisheries from Transiting Vessels

Space use conflicts between sport fisheries in the Bay and transiting vessels serving the Shore marine terminal are small and considered less than significant (Class III).

As vessels continue to traverse the shipping channels, sport anglers would continue to temporarily lose a small portion (about 11.5 square miles, including the 0.25-mile buffer) of their fishing area. When the time factor for vessels transiting the area is calculated, this exclusion would constitute less than 1.5 percent of the area available to fishing and is considered less than significant (Class III).

FSH-6: No mitigation is required.

Impact FSH-7: Space Use Conflicts on Fisheries Along the Outer Coast

Vessel operators handling crude oil voluntarily agree to maintain a minimum distance of 50 nautical miles offshore the mainland. Most fishing off California is generally within 15 to 20 miles of shore through commercial and sport fishing grounds. No adverse space use conflicts occur (Class III).

Impacts on fisheries, aquaculture and kelp harvesting from the 178 to 325 vessels that are likely to service the Shore terminal are expected to be less than significant (Class III). Vessel operators handling Alaskan North Slope crude have voluntarily agreed to maintain a minimum distance of 50 nautical miles offshore the mainland. Most fishing off California is within 50 miles of shore. Other vessels generally transit

within 15 to 20 miles of shore through commercial and sport fishing grounds. However, required navigational equipment and rules and communication gear aboard the vessels and tankers will continue to be used by operators to avoid conflicts and allow mariners to co-exist.

FSH-7: No mitigation is required.

3.4.3.2 Oil Spills from Vessels in Transit in Bay or along Outer Coast

Impact FSH-8: Fisheries Impacts from Accidental Spills at Shore Terminals or along Bay Transit Routes

Shrimp, herring and sport fisheries in central and north San Francisco Bay, San Pablo Bay, Carquinez Strait, Napa River and Honker Bay are at highest risk of spill contamination. Depending on spill location, size and water and weather conditions, areas upstream of the confluence of the Sacramento and San Joaquin rivers may also suffer harm. In addition the Bay marinas, launch ramps and fishing access points may be threatened, contaminated or closed. Significant adverse impacts (Class I and II) to Bay commercial and sport fisheries would result from oil spill accidents originating at the Shore marine terminal or from transiting tankers that service the terminal.

A significant adverse impact to fisheries will likely result from an accidental spill of crude oil or product that could occur in the estuary during the 20 year life of the Proposed Project. The severity of the impacts will depend on the following: size of the spill, composition of the product, characteristics of the spill (instantaneous vs. prolonged discharge, surface vs. subsurface spill, and so forth), environmental conditions and effect of weathering on spill properties and effectiveness of response and clean-up operations. The risk of a spill occurring depends on the number of vessels servicing the Shore terminal, among other factors.

The overall conclusion from Table 3.1-8 (Annual Probability of Spills from the Terminal) is that the probability of any size spill occurring from the Shore terminal ranges from once every 1.8 years for 178 vessel calls per year to once every 1.3 years for 325 vessel calls per year. However, the probability changes with the size of the spill. For example, for 325 annual vessel visits, the probability of a spill of less than 1 gallon occurring is once every 2.4 years. For a 1,000 bbl spill and assuming 178 vessel calls per year, the probability is once every 150 years. Section 3.1.3.4 (Potential Tanker Accidents Within the Bay) concludes that overall probability of a spill from transiting vessels is once every 1,500 years based on 178 annual vessel visits and is once every 800 years based on 325 annual vessel visits.

Oil spill clean-up and response is fairly effective in containing a spill of 50 bbl or less. Although larger spills have a fairly low chance of occurring, when they occur fisheries would likely be impacted in many different ways: by physical presence of oil on water, fishing restrictions imposed by public agencies to ensure that no tainted seafood

reaches consumers, harbor closures to keep oil in or out, spatial conflicts with clean-up operations, long and short-term biological effects on fish and habitat, changes in seafood markets due to public fears of eating contaminated seafood, fishing interests avoiding areas for fear of contaminating gear and catching tainted fish, fishing area closures forcing interests to other areas, thus crowding uncontaminated areas and reducing overall catches and public reluctance to return to an area for sport fishing after a spill. Greater detail on effects of spills on fisheries is in Chambers Group 1994. A summary is provided below.

Fisheries at Greatest Risk

Chambers Group 1994 concluded that fisheries in the Estuary that are especially vulnerable to oil spills are:

- Commercial shrimp (Carquinez Strait and eastern San Pablo Bay) and herring (central San Francisco Bay);

- Sport salmon, sturgeon, and bass (San Pablo, San Francisco Bays, Carquinez Strait and Napa River), western Suisun Bay fisheries, halibut and rockfish (central Bay), smelt (Tiburon, Angel Island and Berkeley Pier), perch (San Pablo and central Bays, Angel Island, Berkeley Pier, Tiburon) and clam beds (Richmond); and

- Herring spawning (southern San Pablo and central Bays, Oakland/Alameda).

In particular, Mare Island Strait and the Napa River are vulnerable to spills and support salmon, sturgeon and bass fishing, in addition to several fishing access facilities. Honker Bay and the Sacramento River have a high vulnerability to 10,000 bbl spills, however the risk of such a spill occurring is low.

Oil Spill Scenarios and Oil Spill Impacts

Chambers Group 1994 concluded that several modeled spills launched in different locations in the Estuary, either at terminals or in shipping lanes, would likely cause impacts ranging from Class I to III on the various Estuary fisheries, depending on location, size of modeled spill and season. The EIR based its conclusions on calculating the percentage of fishing area that would potentially be covered by the modeled spills. The percentage of the affected fishing areas were compared to the 10-percent impacts threshold explained in the impact significance criteria. The quantified impacts were assumed to be the minimum expected impacts because impacts on the fish and their habitat and economic impacts may be long term and are difficult to quantify.

In particular, the EIR modeled two 1,000 bbl spills at the east end of Carquinez Strait, from tankers near the Shore marine terminal, in February (Scenario 5) and July (Scenario 6). If a spill similar to Scenario 5 occurred, the Honker Bay crayfish fishery would likely suffer Class III impacts and Suisun Bay fisheries would likely suffer Class I impacts. If a spill similar to Scenario 6 occurred, Suisun Bay fisheries would likely suffer Class III impacts.

Section 3.3.3.2 in Biological Resources provides detail on effects of modeled spills on fish and habitat. To summarize, the Section concludes that spills from the Shore terminal and elsewhere in the Bay would have significant adverse impacts (Class I and II) on plankton, the benthos (specifically Dungeness crab and eelgrass), anadromous fishes (salmon and steelhead trout), and fishes that spawn in the Bay, particularly Pacific herring and longfin smelt.

Significant adverse impacts (Class I and II) to commercial and sport fisheries in the estuary would result from oil spill accidents originating at the Shore marine terminal or from transiting tankers that service the terminal. The extent of impact (Class I or Class II) would depend on the extent of damage and effectiveness of containment and rapid cleanup, and residual impacts. Shrimp, herring and sport fisheries in central and north San Francisco Bay, San Pablo Bay, Carquinez Strait, Napa River and Honker Bay are at highest risk of spill contamination. Depending on spill location, size and water and weather conditions, areas upstream of the confluence of the Sacramento and San Joaquin rivers may also suffer harm. In addition the 140 marinas, launch ramps and fishing access points may be threatened, contaminated or closed.

Mitigation Measures for FSH-8:

The following mitigation measures shall be applied by Shore Terminals to minimize the areas precluded to fishing during a spill and subsequent cleanup, and to help offset the losses to fishing interests and businesses dependent on fishing activities.

FSH-8a: Implement mitigation measures OS-3 through OS-6 in Operational Safety/Risk of Accidents, and mitigation measures BIO-6b through BIO-6d to lower the probability of an oil spill and increase response capability.

FSH-8b: Notifications shall be posted at spill sites and marinas, launch ramps and fishing access points to warn fishing interests of locations of contaminated sites. Notices shall be written in English and Spanish, and be posted in areas most likely to be seen by fishing interests.

FSH-8c: Provide financial compensation in accordance with the California Oil Spill Prevention and Response Act.

FSH-8d: Contribute to independent public or private organizations, acceptable to the CSLC, who evaluate the effectiveness of mitigation measures (results of the evaluation would be available to public decision-makers to ensure refinement, if necessary, modification of mitigation measures). Evaluation would be done only after an accident and would include monitoring using scientifically accepted protocols. Contributions would be determined by the level of impact and in cooperation with the various organizations, agencies, and the CSLC.

Rationale for Mitigation: Containment of small spills and protection of resources may reduce impacts to fisheries to less than significant for small spills. For large spills significant impacts are likely to occur even with containment. Posting of notices provides information to protect the public from contact with contaminated fish, providing

compensation helps to pay for the costs of cleanup, and contributing to evaluations of the effectiveness of mitigation measures would help to refine such measures to increase effectiveness for future spill events.

Residual Impacts: Impacts are expected to remain significant (Class I). Over the short term (less than a year) some fishing interests may not be compensated, and opportunities would be lost while fishing areas are inaccessible. These impacts may be especially acute for anglers who depend on fishing for a major source of food. Over the long term, impacts could result if, for example, areas remain closed due to contamination or public fears of eating contaminated fish result.

Impact FSH-9: Fisheries Impacts from Accidental Spills Outer Coast Transit Routes

Significant adverse impacts (Class I and II) to outer coast commercial and sport fisheries could result from oil spill accidents from transiting tankers. The level of impact would depend on the size of the spill, location, and fisheries occurring in the area of spread of the spill.

Analysis for this section is taken from Chambers Group 1994 and Aspen Environmental Group 1992. To summarize, Chambers Group (1994) assessed impacts from two crude oil spill scenarios, 100,000 bbls each, one launched in March off the Farallone Islands and the other launched in October, southwest of Punta Gorda. Impacts ranged from adverse and significant to adverse but less than significant (Class I to Class II), depending on the location of the spills, location of the fisheries, and the number of harbors or shoreline access points affected. Impacts were assessed on commercial and recreational fisheries, aquaculture operations, and kelp harvesting activities in the area from Del Norte County to Monterey County.

Scenario 1 (Farallone Islands) caused significant adverse impacts (Class I) on commercial and recreational fisheries from Point Reyes to Monterey County and on aquaculture operations in Monterey Bay and off Santa Cruz. Significant adverse impacts that can be mitigated to less than significant (Class II) occurred to kelp harvesting from Point Montara to Monterey Bay. If vessels bound for the Shore terminal cause similar spills, impacts on aquaculture operations would be more severe. In 1994, 4 operations would have been affected; now, 10 operations in Marin, San Mateo, Santa Cruz, and Monterey Counties would be affected by a similar spill.

Scenario 2 (Punta Gorda) caused Class I and Class III impacts on commercial and recreational fisheries, no impacts on aquaculture operations, and Class II impacts on kelp harvesting. A similar spill from a Shore terminal bound tanker would likely cause similar impacts.

Aspen Environmental Group (1992) assessed coast wide impacts from two spill scenarios that launched spills from the Santa Barbara Channel and Santa Monica Bay; both were 100,000-bbl spills.

The Santa Barbara Channel spill caused significant adverse impacts (Class I) on commercial and recreational fisheries in the Channel and less than significant impacts on fisheries located off Morro Bay and Los Angeles.

The spill caused Class I impacts on aquaculture operations, Class II short-term impacts, and Class III long-term impacts on kelp harvesting. Impacts from a spill caused by a Shore terminal bound vessel are expected to be similar.

The Santa Monica Bay spill caused significant adverse impacts (Class I) on commercial fisheries off Los Angeles and on recreational fisheries off Santa Barbara, Ventura, and Los Angeles Counties. The spill caused Class II impacts on aquaculture operations off Los Angeles, Ventura, and Orange Counties. Kelp harvesting operations were significantly affected (Class II) over the short term. Over the long term, kelp plants would likely recover and harvesting would resume, resulting in adverse but less than significant (Class III) impacts. A similar spill caused by a Shore terminal tanker would affect fewer aquaculture operations, because currently there is only one operation left off Los Angeles County and none off Orange County. However, the two operations in Ventura and the one in Los Angeles County would still be affected by the spill, resulting in Class II impacts.

Mitigation Measures for FSH-9:

FSH-9: Shore Terminal shall implement FSH-8a through FSH-8d to minimize the areas precluded to fishing during a spill and subsequent cleanup, and to help offset the losses to fishing interests and businesses dependent on fishing activities.

Rationale for Mitigation: Containment of small spills and protection of resources may reduce impacts to fisheries to less than significant for small spills. For large spills significant impacts are likely to occur even with containment. Posting of notices provides information to protect the public from contact with contaminated fish, providing compensation helps to pay for the costs of cleanup, and contributing to evaluations of the effectiveness of mitigation measures helps to refine such measures to increase effectiveness for future spill events.

Residual Impacts: Residual impacts are expected to remain significant (Class I) for large spills.

3.4.4 Alternatives Impact Analysis and Mitigation Measures

3.4.4.1 No Project Alternative

Impact FSH-10: Effects on Commercial and Sports Fisheries with no New Shore Terminals Lease

The alternative would eliminate the fisheries impacts associated with wharf operations at the Shore terminal resulting in a beneficial (Class IV) impact.

Fisheries impacts would be transferred to other marine terminals and would be similar to the Proposed Project. Shore has no responsibility for these terminals.

Ceasing operation of the marine terminal would result in abandonment, removal or conversion to another use. Decommissioning and/or deconstruction of the terminal would cause temporary disturbance to fisheries habitat and nearby sport fishing. In the long-term fisheries habitat would likely be reclaimed and more area would likely open up for sport fishing, resulting in a beneficial impact (Class IV).

A consequence of the No Project Alternative would be increased use of existing pipelines to transport product stored at the Shore terminal upland facility. It is assumed use of these pipelines would redirect tankers to other terminals in the area, including Shell Refining Martinez, Valero Benicia and Tesoro Amorco. Impacts on commercial and sport fisheries would be eliminated at Shore but would be transferred to the three terminals and would be similar to impacts for the Proposed Project.

FSH-10: No mitigation is required.

3.4.4.2 Increased Use of Existing Pipelines for Continued Operation of Upland Facility Alternative

Impact FSH-11: Continued Shore Upland Operations via Existing Pipelines

Increased use of existing pipelines would have no impacts from routine operations. A pipeline spill or substantial leak that would reach a creek, stream, lake, or other water body could result in a significant, adverse (Class I or II) impact to fisheries, most likely sports fishing. The level of impact would depend on whether the spill could be easily contained.

Except in the case of an accident, no impacts to fisheries would occur from the increased use of existing pipelines. The impacts of an oil spill from a pipeline to fisheries resources would be less than from a spill at the Shore marine terminal. A pipeline spill would have to reach a waterbody that contained and impacted fisheries, most likely sports fishing. The oil could contaminate a substantial amount a water body if not rapidly contained and oil potentially could be transported to San Francisco Bay where fisheries could be impaired. Impacts would be considered as significant adverse (Class I and II) impacts.

Mitigation Measures for FSH-11: Shore shall implement mitigation measures BIO-9a and OS-10b. For pipelines under Shore Terminals operation, in the event of a spill, Shore shall implement mitigation measures FSH-8b through FSH-8d.

Rationale for Mitigation: Containment of small spills and protection of resources may reduce impacts to fisheries to less than significant for small spills. For large spills significant impacts are likely to occur even with containment. The measures BIO-9a to develop a response plan to contain spilled oil and protect biological resources, and

OS-10b for implementation of proper pipeline engineering, design, inspection, and maintenance will both help to reduce impacts. Measures FSH-8b through FSH-8d requires posting of notices that provides information to protect the public from contact with contaminated fish, providing compensation that helps to pay for the costs of cleanup, and contributing to evaluations of the effectiveness of mitigation measures that helps to refine such measures to increase effectiveness for future spill events.

Residual Impacts: Even with mitigation, significant adverse (Class I) impacts to fishing could occur if residual impacts remain.

3.4.4.3 Modification to Existing Pipelines for Continued Operation of Upland Facility Alternative

Impact FSH-12: Continued Shore Upland Operations via Modifications to Existing Pipelines

Because the PG&E fuel oil line that would be used for this alternative is currently inactive, implementation of this alternative would place risk of a leak or spill in a pipeline where no such risk exists currently. Once constructed, no impacts should occur from routine operations. Significant, adverse (Class I or II) impacts to a waterbody could occur, depending on whether the spill could be easily contained.

Because the PG&E fuel oil line that would be used for this alternative is currently inactive, implementation of this alternative would place risk of a leak or spill in a pipeline where no such risk exists currently. This alternative could involve construction of onshore pipeline connections to the Shore Selby, Tosco Rodeo and the Chevron Long Wharf. Depending on the routing of the pipeline connections, disturbance to streams and sloughs tributary to the Estuary could result in disturbance to habitat and preclude access to fishing areas. Impacts could range from Class I to Class III, depending on location and construction techniques.

A spill or leak from a pipeline is less likely than from tanker operations and are usually more readily contained and cleaned up than spills from tankers. Therefore, this alternative would have lower risk of significant adverse impacts to fisheries than the Proposed Project. However, as with existing pipelines discussed in FSH-11, above, a leak or spill could still result in a significant adverse (Class I or II) impact depending on level of impact and effectiveness of response.

Mitigation Measures for FSH-12:

FSH-12a: Shore Terminals shall place signage at stream/slough crossings and local marinas to alert anglers to access restrictions, site specific revegetation/ reclamation plans, and preparation of accident prevention plans. This shall apply to areas where construction poses a hazard to anglers and for pipelines under Shore Terminals responsibility.

FSH-12b: In the event of a spill, Shore shall implement FSH-11.

Rationale for Mitigation: For construction, placement of signage, notifications, and accident prevention plans would reduce hazards to anglers from construction activities. Per FSH-11, measures BIO-9a to develop a response plan to contain spilled oil and protect biological resources, and OS-10b for implementation of proper pipeline engineering, design, inspection, and maintenance will both help to reduce impacts. Measures FSH-8b through FSH-8d requires posting of notices that provides information to protect the public from contact with contaminated fish, providing compensation that helps to pay for the costs of cleanup, and contributing to evaluations of the effectiveness of mitigation measures that helps to refine such measures to increase effectiveness for future spill events.

Residual Impacts: Even with mitigation, significant adverse (Class I) impacts to fishing could occur if residual impacts remain.